

## Class

Electrolyte, Anticonvulsant, CNS Depressant

## Pharmacologic properties

Magnesium is a cation that acts as a cofactor of the cellular membrane sodium-potassium pump, and plays an integral role in maintaining intracellular potassium levels. Magnesium is essential for energy transfer and electrical stability, and acts as a powerful antiarrhythmic - particularly in the setting of Torsades de Pointes (TdP). It is also a CNS depressant effective in the management of seizures associated with toxemia of pregnancy (pre-eclampsia/eclampsia) not affecting the mother or fetus/neonate, and a bronchodilator effective for asthma and COPD.

## Indications

- Bronchospasm (wheezing) unresponsive to Albuterol and Ipratropium Bromide [Protocol 8](#), [Protocol 8P](#).
- Parenteral anticonvulsant for the prevention and control of seizures in severe toxemia of pregnancy and gestational hypertensive crisis (pre-eclampsia) [Protocol 19](#).
- Torsades de Pointes (Polymorphic V-Tach) [Protocol 9](#), [Protocol 9P](#).
- Refractory ventricular fibrillation [Protocol 9](#), [Protocol 9P](#).
- Hypomagnesemia in cardiac arrest [Protocol 9](#), [Protocol 9P](#).

## Contraindications

- Renal Failure

## Precautions

- Avoid rapid IVP unless unstable
- **May induce respiratory depression or apnea – Patients in hypermagnesemic state, treat with 10% Calcium Chloride to counteract the potential hazards associated with magnesium intoxication**
- Use with extreme caution in patients with myasthenia gravis, neuromuscular disease, or heart block

## Side Effects/Adverse Reactions

- Loss of deep tendon reflexes, Respiratory Arrest, Hypotension, Drowsiness and Flushing

## Dosages and Administration

### Adult

#### Adult Severe Bronchospasms

- 2 grams mixed into a 50 mL of NS IV/IO over 8-9 minutes with a macro drip set at 1 drop/second.

#### Adult Pre-eclampsia

- 2 grams mixed into a 50 mL of NS IV/IO over 8-9 minutes with a 10 gtt (macro) drip set at 1 drop/second.

#### Adult Eclampsia

- 4 grams mixed into a 50 mL of NS IV/IO over 8-9 minutes with a 10 gtt (macro) drip set at 1 drop/second.
  - May be repeated once if BP remains above 160 systolic, 5 minutes after complete administration of first dose.

#### Adult Torsades de Pointe or Refractory VF

TdP with a Pulse: 2 grams mixed into a 50 mL of NS IV/IO over 8-9 minutes with a 10 gtt (macro) drip set at 1 drop/second.

TdP without a Pulse: 2 grams IV/IO over 2 minutes.

### Pediatric

#### Pediatric Acute Bronchospasms

- 40 mg/kg (MAX 2 gm) mixed into a 50 mL of NS over 20 minutes with a 10 gtt (macro) drip set at 1 drop every 2 seconds.

#### Pediatric Torsades de Pointe or Refractory VF

Pediatric TdP with a Pulse: 25-50 mg/kg (MAX 2 gm) mixed into a 50 mL of NS over 8-9 minutes with a 10 gtt (macro) drip set at 1 drop/second.

Pediatric TdP without a Pulse: 25-50 mg/kg (MAX 2 gm) IV/IO over 2 minutes.